interior because the mountain structures reflect more light than the level areas; at the *limb* the mountains form the entire visible reflecting background, the level plains and valleys not forming any part of it. I think we must look for a similar explanation in the case of *Mars;* though, as others have pointed out, other things being equal, very steep mountain slopes would be required.

The importance of making a series of short-exposure photographs in connection with other observations of the planet is very evident. W. W. C.

The Levels of the Meridian Circle.

A progressive change has been taking place in the level of the instrument, marked by exceptional uniformity with but little variation from day to day.

It seemed at first possible to connect the change with that of temperature, as the level correction decreased with the approach of cold weather. But whatever small part of the change follows from this cause is evidently masked by the regular movement. The fluctuations of temperature within periods of a few days have often been nearly up to the total range, while the level has shown no variation to correspond.

In tabulating the mean level by months, the temperature given is the mean of the thermometer readings at the times the levels were taken:

		b.	Temp.
1893.	September	+.663	54°.5
	October	+.648	55 .2
	November	+.623	50 .6
	December	+.561	48 .8
1894.	January	+.506	45 .3
	February	+.402	40 .3
	March	+.359	44 .3

The azimuth of the instrument shows no progressive change, the daily fluctuations being nearly as great as the whole variation. R. H. T.

Schiaparelli's Observations of Bright Spots on *Mars.*

On a previous page of this *Publication* I referred to Schiaparelli's observations of bright spots on the planet *Mars.* I have translated his account of them as follows, from *Himmel und Erde*, Vol. I, pages 14, 15, 16, 159, for the benefit of *Mars* observers. W. W. C.

"The marked peculiarity that the regions of doubtful character are often brighter in oblique positions near the edges of the planet than at the central meridian, applies also to some regions of a purely continental character. We may mention particularly as of this character the two nearly circular regions, *Elysium* and *Tempe.* Very frequently these regions would be white with a more or less bright luster, but always less brilliant than the polar cap. But their white color is generally seen best when they are near the edge of the disc, and I have often observed them even when, some hours earlier or later, on passing over the central meridian, they have shown nothing unusual. The similar transformations of *Argyre Island* are especially interesting. At times, when on the edge of the planet, it has been so brilliant that some observers have actually taken it for a polar cap. This intensely bright island was first observed by DAWES, in 1852, and English observers of *Mars* have called it DAWES' *Snow Island.* Yet I have often seen it of a yellow or even dark-red color when near the central meridian. I consider another island, which is smaller and further south, to be of a similar nature. It is called on the map *Argyre II.* I first saw it on November 8, 1879, when it was on the left edge. It was only a little less bright than the polar cap, but, when passing over the central meridian, it was very much fainter and of a dull-red color.

"In addition to these changes of color which depend upon the diurnal rotation of the planet, we observed in the continental regions still other similar changes, but of slower character, which often embraced very extensive regions. Thus, for example, in the years 1877–79 the whole extensive region lying under *Mare Sirenum* between longitudes 120° and 170° down to 40° North Declination was far brighter than the other continental districts, especially the upper part bordering upon the above mentioned sea. Traces of dark markings were unusually indefinite and hard to make out. In the year 1882 this part appeared more yellow, and it was possible (although requiring great effort) to see a complicated system of dark lines, as also (though less completely) in the years 1884 and 1886. But in 1888 this region was again bright and white, and it was with difficulty that a trace of the lines observed at preceding oppositions could be seen.

"To this belong also the observations made by me in 1877–82 of a small, bright white spot which was situated at the left end of *Nepenthes* at longitude 269° and latitude + 17°. I first saw this

spot on September 14, 1877, when it was almost square and about 8° on a side. It was more brilliant than any other part of the planet, its borders were well defined, and I have no hesitation in saying it was comparable in brightness to the south polar cap. It was still visible on the 14th of October. I observed the same phenomenon at the same place at the following opposition, from November, 1879, to January, 1880. Its size had not changed, but its form had become almost round. Astonished at its persistency, I gave it the name *Nix Atlantica.* At the opposition of 1881–82 I saw it again, from November to March, but not always with equal ease; it showed differences of appearance and fluctuations in brilliancy which perhaps could not always be attributed to the various conditions of the telescopic images. But at the following oppositions I have sought for it in vain, and it has also been invisible this year (1888). If its appearance depends upon the time of the year on *Mars*, then we should expect to see it again at the 1892–97 oppositions, and it is easy to realize how valuable its reappearance would be in the investigation of the physical constitution of the planet.

"Another similar spot (*Nix Olympica*), though much smaller and more difficult, was very persistent during the 1879 opposition in the position longitude 129° and latitude + 21°. Its diameter could not have been more than 4°. It has not been seen at other and later oppositions. Other spots of more or less brilliant and pure white have been seen here and there in the different continental regions, generally several days in one place, and following no apparent law. They have been seen very often during the last opposition along the straight shore of *Syrtis Major* and along the coast from there to *Sabaeus Sinus*, as well as in many other parts. * * * Often a remarkably large part of the planet is sprinkled with white spots, as, for example, on the 18th and 19th of January, 1882, in the region between the *Ganges* and *Iris*, and January 31, 1882, between *Nilosyrtis* and *Indus*.

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"It would not be difficult to find a series of hypotheses which would explain satisfactorily the appearance of the polar and other white spots by attributing them in some way to the evaporation of the supposed seas, and to the atmosphere of the planet whose existence is indisputable. But I consider it more useful to point out that these different white spots are, of all the species of appearances on *Mars*, the easiest to observe. They require only an

instrument of moderate power and a very persevering attention. The peculiarities which I have pointed out concerning these spots show that they offer a field for the most interesting investigations, whose importance in the study of the physical constitution of *Mars* is obvious; and in this field useful work could be done by those observers who are not able to decipher the much more difficult details of the canals and their doubling."

Discovery of Comet I, 1893.

In *Astronomy and Astro-Physics* for April, 1894, page 307, Professor Schaeberle has described a cometary form which he found on his eclipse negatives taken in Chile on April 16, 1893, and to which he first called attention at the World's Fair Astronomical Congress in August, 1893. In May, 1894, we received copies of the eclipse negatives taken by the British expeditions to Brazil and Africa, respectively. Professor Schaeberle has found the same object on the British plates also. The distance of the brightest part of the comet from the Moon's limb, expressed in fractions of the Moon's diameter, is: Chile, 0.88; Brazil, 1.15 ±; Africa, 1.50 ±. The perihelion passage of this comet must be about April 16. The daily geocentric motion of the comet at the time was about 3¼ degrees.

The comets of 1893 should therefore be numbered:

Comet I. Discovered by Schaeberle;

Comet II. Discovered by { Sperra, R. de Luna, Rordame and others;

Comet III. Discovered by Finlay;

Comet IV. Discovered by Brooks.

Edward S. Holden.

Lick Observatory, 1893, May 8.